simplifications and corrections needed to avoid mathematical difficulties and approximation of real conditions as close as possible.

Such approach needs experimental determination of the basic model parameters (velocities, dispersion coefficients and others) in natural field conditions. This can be made by means of the tracer method. The radioisotopes ^{82}Br, ^{131}J as well as the fluorescent dyes Rhodamine B and fluorescein can be used as tracers.

Experiments of this type were carried out at a selected section of the Wkra River in June 1997. The water-alcohol Rhodamine B solution was used as a tracer.

Five cross-sections, in approximately every 2 km of the river course, have been established for measurements of the tracer concentration distribution. The continuous measurements of the tracer fluorescence have been carried out by means of Turner 10-105 fluorometers localized in each cross-section. The river bed bathymetry and hydrometric measurements of the river flow conditions have been also measured in every cross-section during the course of experiment.

Because the first cross-section has been localized at the distance longer than needed for complete mixing in vertical and transverse directions of the stream, the problem has been simplified to the one-dimensional dispersion phenomena. Thus, only the longitudinal dispersion coefficient was determined. All experimental results are presented in Table.

Obtained parameters will be used for the river transport modelling.

The experimental results of time and spatial distribution of effluent concentration (typical set of RTD curves presents Fig.) can be used for model validity verification.

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A RADIOTRACER STUDY ON THE LOCALIZATION OF FAVOURABLE SEDIMENTATION ZONE IN A BIG INDUSTRIAL SEDIMENTATION BASIN

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Removal of suspended matter from sewage is one of the stages of sewage purification, especially in biological treatment where the activated sludge is added to the system and should be removed from the sewage before its discharge into the natural receiver.

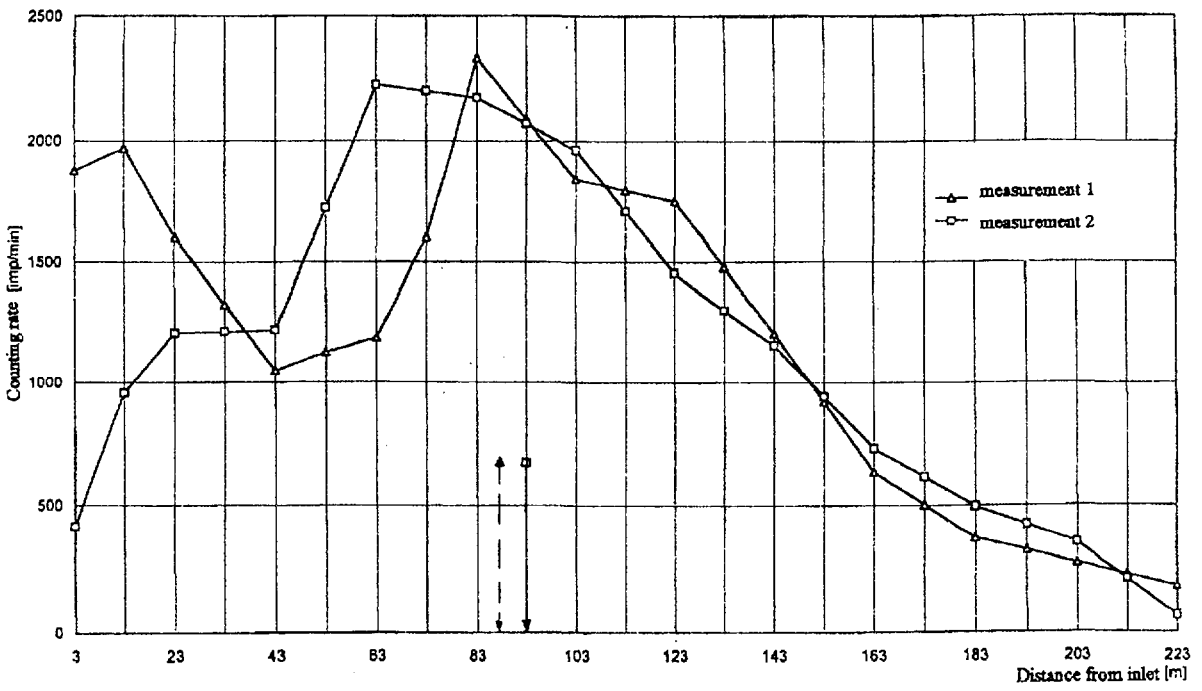

Fig.1. Sediment transport diagram session 1.

The process is usually realized in two steps. Preliminary sedimentation with recirculation of the biological sludge and secondary step where the sewage are finally clarified in a big settling basin. The accumulated sediment is periodically removed from the basin after its filling during the exploitation period. At that moment the parallel technological line should be ready to work.

It is technologically resonable to prolongate the sedimentation compain time as much as possible. For this reason the sludge transport and sedimentation mechanism should be known in detail. Before designing any technical solution for partial removal of the accumulated sludge during the compain, its best localization in the sedimantation basin should be find out.

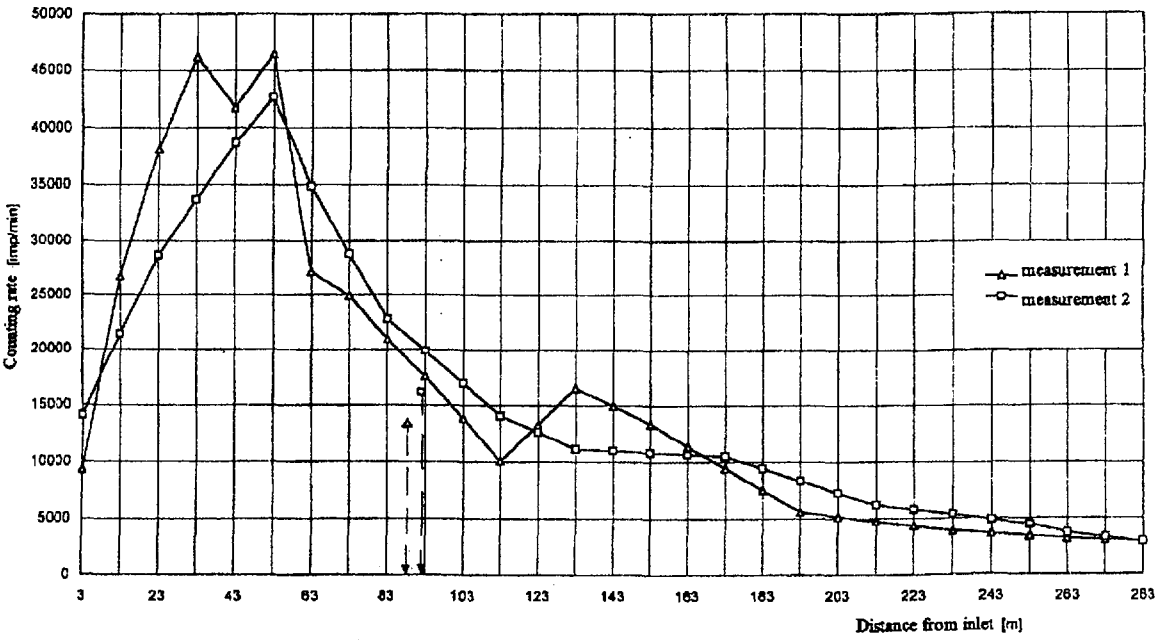

Fig.2. Sediment transport diagram session 2.

Two series of experiments were carried out in a big settling basin (340x60x3 m) of the biological sewage treatment plant in a petrochemical factory.

The tracer method was used for that purpose. The region of the favourable sedimentation was determined in two stages of the basin filling: the first just after the beginning of the compain (filling with sediment about 15%), the second in the middle of the compain (filling about 45%).

As a tracer for sediment, the gamma-radioactive La-140 was chosen. The isotope has been permanently sorbed on the activated sludge grains taken from the inlet system. The labelled sediment bottom distribution as well as its bathymetry were measured by means of a specially equipped boat. The residence time distribution of the sewage was also measured. The fluorescein was used as a tracer for the aqueous phase.

It was proved that the localization of the most favourable sedimentation region is independent of the sediment accumulation in the basin. The cross--section most convenient for the deposition of any sludge removing system without interuption of the compain was determined basing on the localization of the tracer cloud of center gravity (Figs. 1 and 2).

EMPIRICAL MODEL EQUATIONS FOR THE REMOVAL EFFICIENCY OF SO_2 AND NO_x IN A MULTISTAGE E-B SYSTEM OF FLUE GASES PURIFICATION

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On the basis of the results of experimental work carried out in an e-b pilot plant, the differences in the influence of the process parameters on the removal efficiency of SO_2 and NO_x have been observed. In the case of multistage e-b treatment of flue gases the following process parameters should be taken into consideration in the determination of the removal efficiency of SO_2 and NO_x [1-4].

- absorbed dose of e-b irradation [D],
- initial concentration of NO_x $[NO_x]_0$,
- temperature of flue gases in the entrance to the reaction vessel $[T_{pn}]$,
- humidity of flue gases after conditioning process [H],
- residence time of flue gases inside the reaction vessel $[\tau]$.

The listed above parameters have an unequal influence on the e-b removal process of SO_2 and NO_x. The absorbed dose and the initial NO_x concentration in flue gases indicate a major influence on the removal efficiency of NO_x. An increase of absorbed dose and a decrease of initial concentration of NO_x leads to increasing removal efficiency of these compounds.

In the case of SO_2 we observe a strong influence of temperature and humidity of flue gases on its removal degree. A decrease of temperature and an increase of water vapour content in flue gases coming to the reaction vessel, cause an increase of removal efficiency of SO_2.

The different influence of the process parameters on the e-b simultaneous removal of SO_2 and NO_x can be explained by the difference in the chemical paths of both reactions (Fig.1). The elimination of NO_x occurs through a radiochemical reaction while the elimination of SO_2 is realised mainly